

REMARKS

As stated above, Applicants appreciate the Examiner's thorough examination of the subject application and request reexamination and reconsideration of the subject application in view of the preceding amendments and the following remarks. The Applicants have carefully reviewed and considered the Office Action mailed on February 15, 2006, and the references cited therewith.

Presently, claims 1-27 are pending. Independent claims 1, 9, 17 and 22 have been amended; as a result, claims 1-27 are still pending in this application. Independent claims 1, 9, 17 and 22 have been amended to clarify the Applicants' invention. In particular, each independent claim has been amended such that either a persistent reservation or a persistent affiliation is created.

In the claims as originally filed, the conjunctive term "and" was used. Applicants' intent was to use that term to mean the claims read on "creating at least one" of a persistent reservation or a persistent affiliation. By this amendment, the use of the term "and" is replaced with "or", and thus, this amendment is being done for clarity only, and is not intended to limit the scope of the claims. No new matter has been added as a result of the changes made thereto.

Concerning Items 1-3 of the subject action, the Examiner rejects claims 1-27, under 35 USC §103(a), as being unpatentable by McNeill, Jr. et al. (U.S. Patent No.: 5,499,378; hereinafter McNeill) in view of a standard SCSI command.

The Examiner points to McNeill as disclosing a SCSI emulation device/target system, which is equivalent to the claimed expander device, capable of communicating with one or more initiator engines and one or more target storage devices using a plurality of communication protocols (column 3, 3rd paragraph). The Examiner also points to McNeill as disclosing emulating a standard SCSI command (column 3, lines 23-27).

The Examiner concedes that McNeill does not explicitly disclose persistent reservation and persistent affiliation. However, the Examiner states that since the persistent reservation is a standard SCSI command as disclosed in the specification, one with ordinary skill in the computer art would implement McNeill's expander device to emulate the persistent reservation. Additionally, the Examiner states that since McNeill's emulation device also connects to non-SCSI devices on a SCSI network and translates the SCSI commands accordingly, McNeill's

emulated SCSI commands on the non-SCSI devices are equivalent to the claimed persistent affiliation.

The Examiner also points to McNeill as disclosing connecting to a non-SCSI device (column 3, line 18) and as disclosing the device as a serial magnetic disk (figure 2), which is equivalent to the claimed SATA storage. The Examiner states that it would have been obvious to one having ordinary skill in the computer art at the time the Applicants made the invention to implement a standard SCSI command emulation with McNeill because McNeill teaches one to expand the SCSI connection with a SCSI emulation and McNeill further teaches one to emulate the standard SCSI command in order to establish the connections.

Applicants' amended independent claim 1 is directed to an apparatus requiring:

an expander device capable of communicating with one or more initiator engines and one or more target storage devices using a plurality of communication protocols, said expander device further capable of creating at least one of a persistent reservation or a persistent affiliation between one or more target SATA storage devices and one or more said initiator engines. (emphasis added)

Amended independent claims 9, 17 and 22 include similar subject matter. In general, a Serial Advanced Technology Attachment (SATA) device may exchange data and/or commands with e.g., a controller circuit card using a SATA communication protocol. In this regard the subject application reads:

"If a Fibre Channel (FC) protocol is used by circuit card 120 to exchange data and/or commands with mass storage 104 and/or 106, it may comply or be compatible with the interface/protocol described in "ANSI Standard Fibre Channel Physical and Signaling Interface-3 X3.303:1998 Specification." Alternatively or additionally, if a serial ATA (S-ATA) protocol is used by controller circuit card 120 to exchange data and/or commands with mass storage 104 and/or 106, it may comply or be compatible with the protocol described in "Serial ATA: High Speed Serialized AT Attachment," Revision 1.0a, published on January 7, 2003 by the Serial ATA Working Group and/or earlier and/or later published versions of the SATA standard. Further alternatively or additionally, if a serial attached small computer system interface (SAS) protocol is used by controller circuit card 120 to exchange data and/or commands with mass storage 104 and/or 106, it may comply or be compatible with the protocol described in "Information Technology - Serial Attached SCSI - 1.1," Working Draft American National Standard of International Committee For Information Technology Standards (INCITS) T10 Technical Committee, Project T10/1562-D, Revision 1, published September 18, 2003, by American National Standards Institute (hereinafter termed the "SAS Standard") and/or earlier and/or later published versions of the SAS Standard. The SAS protocol may comprise Serial Advanced Attachment (ATA) Tunneled Protocol (STP) and Serial Small Computer System Interface (SCSI) Protocol (SSP)." (Page 4, line 15 to Page 5, line 10; emphasis added).

Based on the protocols being used, a persistent reservation may be produced. A persistent reservation may permit exclusive access rights to one or more drives. In this regard, the subject application reads:

“Referring specifically to SAS drives comprised in mass storage 104, SAS initiator circuitry 142 may be capable of generating SCSI commands to provide, for example, persistent reservations between one or more SAS drives comprised in the mass storage cluster 104 and one or more initiator engines 140. Such SCSI commands may be transmitted by SAS initiator 142 and transmitted through expander device 150 to one or more SAS drives, using for example, SSP commands. SCSI commands, as used herein, may comprise one or more commands as described in “Information Technology – SCSI Primary Commands – 3 (SPC-3)” published on May 16, 2003 by the T10 Technical Committee of Accredited Standards Committee and/or later published versions. “Persistent reservations”, as used in any embodiment herein, may comprise one or more SCSI Primary Commands capable of reserving one or more SAS drives for one or more initiator engines 140. Also, “persistent reservations”, as used in any embodiment herein, may mean that reservations, as may be defined by the aforementioned T10 standard, may be maintained across power cycles (i.e., reset and/or reboot events occurring at the circuit card 120, expander device 150 and/or one or more SAS drives). A “reservation” may mean initiator engine 140 may be granted exclusive access to an entire SAS drive, or certain portions of a SAS drive. Alternatively, reservations may mean that an initiator engine 140 is granted limited exclusive access, read-only access, write only access, and/or other reservations as may be defined in the aforementioned T10 standard. Of course, SAS circuitry may be capable of other operations as may be defined in the SCSI Primary Commands without departing from this embodiment.” (Page 8, line 4 to Page 9, line 2; Emphasis added).

Furthermore, a persistent affiliation may be produced, for example, to grant exclusive access to a SATA device. In this regard, the subject application reads:

“Referring again to SAS drives comprised in mass storage 104, SAS initiator circuitry 142 may be capable of exchanging commands and data with expander device 150 and/or one or more SATA drives to create persistent affiliations between one or more SAS drives comprised in the mass storage cluster 106 and one or more initiator engines 140. Persistent affiliations between initiator engine 140 and one or more SATA drives may be created using the aforementioned SAS communication protocols. Also, “persistent affiliations”, as used in any embodiment herein, may mean affiliations, as may be defined by the aforementioned SAS standard, which may be maintained across power cycles (i.e., reset and/or reboot events occurring at the circuit card 120, expander device 150 and/or one or more SAS drives). An “affiliation” may mean initiator engine 140 may be granted exclusive access to an entire SATA drive as may be defined in the aforementioned SAS standard. Of course, SAS circuitry 142 may be capable of other operations as may be defined in the SCSI Primary Commands without departing from this embodiment.” (Page 9, line 11 to Page 10, line 2; Emphasis added)

While persistent reservations may be used with SAS (Serial Attached Small Computer Systems Interface (SCSI)) devices, SATA drives do not support persistent reservations. An expander device is described that may provide persistent reservations. In this regard, the subject application reads:

Conventional SATA drives do not support persistent reservations. Accordingly, in this embodiment, the expander device 150 may be capable of emulating SCSI commands to provide persistent reservations for one or more SATA drives coupled thereto. Persistent reservation emulation commands may be stored in memory 154. Persistent reservation emulation commands stored in memory 154 may be accessed by expander circuitry 152 to cause expander circuitry 152 to provide persistent reservations for one or more SATA devices comprised in mass storage 106, as will be described below. (Page 9, lines 3-10; Emphasis added)

The expander device may create a persistent reservation or a persistent affiliation between one or more target SATA storage devices and one or more said initiator engines. Thus, a persistent reservation may be supported by a SATA storage device.

In the subject action, the Examiner equates a serial magnetic disk (shown in Figure 2 of McNeill) to a SATA storage device. Citing from the subject action:

“McNeill discloses connecting to non-SCSI device (column 3, line 18), and McNeill discloses the device as a serial magnetic disk (figure 2), which is equivalent to the claimed SATA storage.” (Page 3, first full paragraph)

McNeill is understood to describe a magnetic disk 16 that may be accessed for command retrieval. In this regard McNeill reads:

“The device 16 is now available to the initiator system and can be accessed by any routine which accesses local peripheral devices. An example of such an interaction is given in FIG. 4 utilizing the identified columns A-E of FIG. 3. An application program requests a Read command from the target system magnetic disk 16. The program assumes the magnetic disk 16 is local to the initiator system 10 of FIG. 2. The DOS operating system calls the initiator system's BIOS identified by sequence box 42, which builds the Read Subsystem Control Block (SCB) as identified by sequence box 44. The initiator SCSI adapter 18 builds the SCSI Read command, as identified by sequence box 46, and selects the target system 14 as if the target system 14 were the magnetic disk 16, as identified by line 47. The target adapter 20 receives the Read command and interrupts the target system 14 as identified by sequence box 48. The target system 14 recognizes the command on line 47 as a Read command to the hardfile 16. The target system 14 calls the local BIOS to do a Read on the local hardfile 16, as identified by sequence box 50. The target system 14 loads the data in a local buffer, of a type well known in the art, and tells the target adapter card 20 to send the data to the initiator, as identified by sequence box 52. The initiator adapter 18 receives the data on line 53 as identified by sequence box 54 and interrupts the initiator system 10 with the data available, as further identified by sequence box 56.” (Col. 5, lines 33-57; Emphasis added)

However, McNeill is not understood to describe or suggest creating a persistent reservation or a persistent affiliation between one or more target SATA storage devices and one or more initiator engines. Furthermore, the reference is not understood to describe or suggest that magnetic disk 16 is a SATA storage device. As taught by Applicants, SATA devices do not support persistent reservations or persistent affiliations. Simply put, neither McNeill nor the standard SCSI commands provide these teachings. Accordingly, Applicants respectfully submit

that amended independent claim 1 is allowable over the combination of McNeill and the standard SCSI command mentioned in the specification.

As mentioned, amended independent claims 9, 17 and 22 include subject matter similar to amended independent claim 1. As such, Applicants respectfully submit that amended independent claims 9, 17 and 22 are allowable over the combination of McNeill and the standard SCSI command. The remaining claims of this rejection depend directly or indirectly upon Applicants' invention of amended independent claims 1, 9, 17 and 22, and thus must be read as incorporating the limitations of the respective independent claims. (35 USC §112, 4th paragraph). Since nowhere does the combination of McNeill and the standard SCSI command disclose or suggest these limitations of amended independent claims 1, 9, 17 and 22, it is respectfully submitted that the Examiner's rejection of claims 2-8, 10-16, 18-21 and 23-27 as being unpatentable over McNeill in view of a standard SCSI command is in error, and should be withdrawn.

Having dealt with all the objections raised by the Examiner, it is respectfully submitted that the present application, as amended, is in condition for allowance. Thus, early allowance is earnestly solicited. The Examiner is invited to telephone Applicants' attorney (603-668-6560) to facilitate prosecution of this application. In the event there are any fees due, please charge them to our Deposit Account No. 50-2121.

Respectfully submitted,

NATHAN E. MARUSHAK ET AL.

By their Representatives,
Customer Number 45459
603-668-6560

Date

4-17-06

By



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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 17 day of 2006.

Name

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